



LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

Preparing Successful ISTC Proposals for Radiological Monitoring Projects

K.A. Surano, M.D. Scheland, J.N. Witow

August 12, 2004

Unification and Optimization of Radiation Monitoring on NPP
Location Regions
Yerevan, Armenia
September 22, 2004 through September 26, 2004

Disclaimer

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

Kris A. Surano

Environmental Protection Department/Proliferation and Terrorism Prevention Program
Lawrence Livermore National Laboratory, P.O. Box 808, Livermore, CA 94550 USA

Mark D. Scheland and Jason N. Witow

Science Centers Program/Office of Proliferation Threat Reduction
United States Department of State, 2201 C Street, NW; Washington, DC 20520 USA

Preparing Successful ISTC Proposals for Radiological Monitoring Projects

The United States Science Centers Program exists because expertise relevant to the production or use of weapons of mass destruction (WMD) exists in the states formerly comprising the Soviet Union. We seek to deter the transfer of that knowledge to people or governments that would use it to do harm or terrorize. Working through the Science & Technology Centers in Moscow and Kyiv, we promote peaceful collaborative science as an alternative to the proliferation of WMD expertise. In concert, we believe that increasing the prosperity of scientists helps reduce the potential attraction of working for rogue states and groups. Therefore, we aim to help scientific groups become successful at developing stable sources of income. Towards that end, we hope to guide former WMD scientists in the successful preparation of not only research proposals to the Science Centers, but future proposals seeking other funding sources as they join the competitive global scientific community.

The International Science and Technology Center (ISTC) and the Science and Technology Center in Ukraine (STCU) have matured into very successful multilateral, non-proliferation enterprises, and there have been a number of successful Science Center-funded environmental radiological monitoring projects completed. Of course, there is still much environmental work to do; the issues are complex, multidisciplinary, vary both temporally and spatially, and do not always observe geopolitical boundaries. However, because environmental, political, and economic conditions around the world are dynamic, the Science Centers, and the US government's participation therein, must evolve accordingly. The environmental arena in general, and nuclear safety/radiation monitoring issues in particular, remain attractive areas in which we should continue to foster technical partnerships and work in a spirit of international cooperation. But all proposals to the Science Centers are facing increasing competition and more rigorous requirements than ever before. Indeed, we must recognize and accept that our Program funding is basically static and will not continue indefinitely. Furthermore, we are being asked to use some of our existing funds to engage former WMD scientists from other parts of the world as US policy objectives develop, and

the number of attractive, high quality technical proposals submitted to the Science Centers continues to grow.

For these reasons, scientists intending to prepare new ISTC proposals should seek to understand the current US proposal evaluation and selection criteria and develop proposal preparation skills in order to maximize their proposal's chance for successful funding. They can also use these skills to help obtain additional and future funding elsewhere. While we recognize that the other funding parties of the ISTC (EU, Canada, Japan, Republic of Korea, Norway, etc.) have their own criteria for proposal selection, we believe it likely they would generally agree with the opinions we express here.

When the US receives a proposal for consideration from the ISTC, it undergoes both technical and policy reviews. Policy reviews are coordinated by the US Department of State and make sure that the proposal meets the goals of the Science Centers Program as it implements the policies of the US government. Science Advisors to the Program routinely send the proposals out for technical review to scientific peers from the discipline of concern. Both policy and technical evaluations are used to prepare the final list of proposals selected for US funding at Governing Board funding sessions.

US technical reviewers are typically research scientists who are very experienced in the preparation of scientific proposals. They expect to see a format and a level of detailed information that compares favorably with proposals they have prepared themselves. In addition, they are generally not paid to conduct these reviews. The more proposers can do to meet reviewers' expectations and make the review task easier, the more likely that a favorable review will result.

Extremely useful information regarding proposal preparation can be found at the ISTC web site [<http://www.istc.ru/ISTC/sc.nsf/html/documents-proposal-preparation>]. Proposers would be well served to consult this excellent guidance and follow it closely. However, there are a few areas that deserve special additional comments from the US proposal-evaluation perspective.

Successful proposals will usually contain the following elements:

- A clear statement of the problem, a rigorous review of the scientific literature.

Proposers need to clearly define what needs to be done and argue why it is important. They need to rigorously research and describe what others have done in the field and clearly explain what the proposal will accomplish that will improve upon their own past work and that of other groups. Along these lines, it is extremely important to have a comprehensive review of the worldwide scientific literature, especially that from the West, with complete reference citations provided. This review can also help define and direct the work, making sure that what is proposed is novel and innovative. US reviewers frequently comment that proposers seem unaware of the current state-of-

the-art and will not endorse a proposal that is unlikely to further scientific and technological developments.

- Good scientific justification and sufficient experimental details/ expected results

The most common complaint from US technical reviewers is that the proposals do not contain sufficient experimental details. Reviewers often say "I know WHAT they want to do, I just don't understand HOW they are going to accomplish it." Too often the proposals describe the problem to be solved and propose/predict a generalized solution, but do not describe how this solution will be attained. A logical, step by step description of the intended activities and expected results is necessary before the US reviewers will give a strong technical recommendation. A hypothesis needs to be stated and then the procedures that will be used to test that hypothesis must be elucidated. In general, US reviewers are looking for the level of detail more frequently seen in ISTC project work plans. Although this is not formally required in ISTC proposals, those that contain this level of detail are more likely to obtain the endorsement of the technical reviewers.

For example, if proposing to make environmental radiological measurements, the proposers need to state how and where the measurements will be made. Technical specifications and expected performance of instruments should be discussed. They also need to explain how and why the particular sampling locations were individually selected. They need to specify the types and numbers of measurements to be made, how the data will be collected/processed/stored, and what statistical tests will be used in the evaluation of the results.

In general, more detailed, yet relevant, experimental information is usually better than less. Proposers should not require the reviewer to guess at what they intend to do and how they intend to accomplish it, nor should they assume the reviewer will figure it out. Their proposal should be explicit and comprehensive. Also, the proposers should state realistic and attainable goals. Proposals that promise impossible deliverables (based on promises of unrealistic technological advances, too short a time to conduct meaningful experiments, or too little funding to accomplish large tasks) are frequently criticized by reviewers.

- A large number/percentage of bona fide former WMD scientists actively involved

Proposers must bear in mind that this Program is first and foremost a non-proliferation program, designed specifically to engage former WMD scientists. While excellent science is a required attribute of all successful proposals, those that also actively engage large numbers of bona fide WMD scientists can become most competitive. A key term here is "actively engaged." It is not sufficient to simply list WMD scientists on the proposal in order to qualify it for our Program; they must be shown to be active participants if the proposal is selected for funding. Well-written

proposals involving excellent science and solving large problems have no chance of being funded by the US under this Program if bona fide WMD scientists are not scheduled to perform large portions of the work.

- Clear demonstration of the capabilities of the proposal participants

While we understand that there are security issues and requirements that must be observed, information that can be provided in addition to the standard ISTC WMD categories and project roles that can help the reviewers evaluate the qualifications of the scientists involved in the project would be valuable. US reviewers regularly state that they don't personally know the proposers and cannot determine their qualifications from the information given; they need to be convinced that the project team has the right technical credentials to conduct the work. A "curriculum vitae/CV" or resume, showing educational/employment history, and relevant skills/knowledge/abilities, plus a list of pertinent and completely cited scientific publications, especially for the principal scientists listed in the proposal, would be extremely welcome - and will substantially improve a proposal's chance to be funded. Such information can be provided in Section 12: Supporting Information. If provided, this can help the reviewers develop confidence in the proposers and in the potential for a successful completion of the project.

- Evidence of established US collaborators willing to work on the proposal/project

A qualified, motivated, and actively participating US collaborator can be an extremely strong asset for a proposal. While the US may select a proposal for funding at a Governing Board meeting without a US collaborator currently identified, it will not provide funds for the project to start until at least one qualified US collaborator is identified and this person approves the project work plan in writing.

Proposers should seek to find US collaborators early; this point cannot be stressed strongly enough. Proposers can help their proposal's chances of success by taking the time to find and engage a qualified US collaborator during, or even before, proposal preparation. It is important that the US collaborator have relevant technical credentials in the area of study. Such collaborators can help define the work and make sure that it is innovative. They should also help construct the proposal in the format and content expected by the US technical reviewers, and can serve as valuable resources when conducting the required literature reviews.

Prospective collaborators can be approached and engaged at scientific/technical conferences/workshops, or can be identified by doing key-word searches on the Internet and contacted via e-mail. Proposers should seek collaborators from US universities, US government laboratories, and/or private industry, and should use every opportunity they have to engage US

researchers in dialogue about their research ideas and active proposals. Not all US researchers will be interested, but the proposers should not be discouraged. With enough effort, all proposers should be able to identify a US colleague to collaborate on the proposal/project or who will help find another US scientist who might be interested in doing so.

Once a collaborator is found, it is important to maintain frequent contact, usually by e-mail. Proposers should also ensure that a letter from their collaborator be on file at the ISTC. It is vital that the letter is strong and thoughtful, and not simply a brief "fill-in-the blanks" form letter -which will not be taken seriously. The letter should stress the importance of the work and the willingness of the collaborator to participate in the project, detail the specific contributions the collaborator will make, cite experience with/confidence in the proponents, and contain a positive evaluation of the sustainability of the work (see discussion below). Such letters, obtained prior to technical review of the proposal, encourage strong technical endorsements from reviewers and ultimately could be the difference between funding and non-funding.

- Strong potential for self-sustainability following completion of the project

From the beginning, it was our Program's intent to provide support to former weapons scientists to assist them in the transition from weapons to civilian applications of their knowledge and talent. In the early years of the Program, the economic environment was not stable enough to support the long term, self-sustainable transition originally envisaged. The 1998 financial crisis also slowed this process. But we are now at a point where this long term transition is possible; our increasing emphasis on sustainability reflects this optimism. In the past, a discussion of the potential sustainability of the work was a very good thing to have in a proposal, but now it has become a critical and required element for proposals seeking US funding.

In considering proposals for funding we assess their potential sustainability, by which we mean the likelihood that the research can generate non-Science Center financial support for follow-on work. We weigh whether a line of research may attract financing from the home government, from intergovernmental sources, or from a private firm or foundation. We assess if the project's intended material or process outcome is likely to have application in producing a product, delivering a service, or increasing efficiency or precision. We ask if there is a likely end-user of the ideas and if the right to exploit the ideas commercially can be protected through patenting. Where a technology is in development, we will assess if the institute is willing to have the technology commercialized and to accept reasonable market terms and conditions for it. Having a motivated and committed US collaborator actively participating in the proposal and project, particularly one from a commercial US company who understands our sustainability focus, would be particularly attractive.

For commercially relevant proposals, information that might help reviewers assess the sustainability potential of the research can be included in a rudimentary, non-proprietary business plan that can be placed in Section 12 of the proposal. Such information could include product, market, cost/benefit, financial, and risk analyses (from US Department of Energy/Initiatives for Proliferation Prevention Program Guidance). Questions that might be answered include, but are not limited to: What is the competitive edge of the proposed technology in comparison with current methods? How long would it take to develop this technology before introduction to the marketplace? What are the key technical barriers that must be overcome before this technology is ready for the marketplace? Are any existing patents relevant to this technology? What market is being addressed and what is its potential size in the US, the CIS, and other countries? What is the potential market growth and what might affect it? What might be potential sales revenue and what market share might be captured? Are there already interested business partners being considered?

- Be written in clear, logical, and understandable English

US reviewers are often frustrated with the language used in ISTC proposals. Despite the fact that they themselves seldom speak Russian, they nevertheless complain that the English language used in the proposals is frequently difficult to completely understand. Proposers should seek to have high quality translations made and make sure their proposal follows an acceptable and logical Western format that contains the correct amount of technical content. US collaborators, if found early during the proposal preparation process as mentioned above, can be of enormous value in this regard. If the proposers help make the proposal easy for reviewers to read, understand, and evaluate by making sure that only high quality English is used, the proposal is more likely to receive a favorable reaction.

- Diagrams, photos, figures (as appropriate)

It is often said, "A picture is worth 1000 words." Some of the most competitive and successful proposals are those that include visual aids/relevant figures. Many reviewers have stated that the figures found in the proposals are among the most valuable tools they use in their reviews. Maps, diagrams, photographs, schematics, flow charts, etc. that help get across the point of the work and make the proposal more understandable for the technical reviewers are encouraged. In this era of relatively inexpensive digital cameras and user-friendly computer graphics software, it should be very easy to incorporate helpful figures into proposals. While inclusion of such elements should never be done simply for the sake of including them, proposals that contain useful and relevant graphics are likely to be very well received.

- Reasonable and defensible total project costs, schedule of deliverables, and time frame

Reviewers will sometimes comment that they are skeptical about certain portions of the proposal. For example, they may state that there are too many people listed on the proposal and that fewer people are necessary to complete the work. Or they may state that some equipment scheduled for purchase is unnecessary, that the experimental schedule seems too accelerated, or the results expected are not obtainable in the time requested. Proposers are encouraged to provide accurate and precise budgets, staffing, time lines, and technical expectations to convince US reviewers that the proposal is credible and realistic.

In general, these days we are all expected to “do more with less.” What we mean is that proposals must accurately reflect the amount of effort/funds required to accomplish the tasks, and proposers should be sensitive to the budgetary limitations imposed on the Program. We want to fund as many excellent proposals as we can and we must all take responsibility to conduct the work as efficiently as possible. It is in the proposers best competitive interests to be resourceful in their requests for funds. Proposals that seem like “bargains” fare well against proposals that seem to have over-inflated budgets. One example of resourcefulness that might help a proposal would be for proposers to show how they plan to use resources from previously completed ISTC projects at their institute, like computers/printers/copy machines, in their proposed work.

We hope that scientists about to prepare proposals to the ISTC in the radiological monitoring area, or others, find this information useful. If they take these suggestions seriously and work to implement them into their proposal writing efforts, we feel that they will be better able to prepare proposals that are highly competitive for both the Science Centers Program and other funding sources.

(Work performed under the auspices of the U. S. Department of Energy by Lawrence Livermore National Laboratory under Contract W-7405-Eng-48; UCRL-PROC-206022)